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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,832	03/18/2004	Toshiyuki Takewaki	PRM-00201	7022

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PATENT GROUP  
CHOATE, HALL & STEWART  
EXCHANGE PLACE, 53 STATE STREET  
BOSTON, MA 02109

EXAMINER
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FENTY, JESSE A

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/803,832	Applicant(s) TAKEWAKI ET AL.	
	Examiner Jesse A. Fenty	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 20-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 20-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Title*

1. The title of the invention is not descriptive and contains method language. A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 and 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Cowens et al. (US 2003/0052414 A1).

In re claims 1 and 20, Cowens (Fig. 2A) discloses a semiconductor device, comprising:

- an interconnect layer (201) provided on a semiconductor substrate;
- a protective film (205) provided on said interconnect layer;
- an electrode pad (207) provided on said protective film; and
- an anti-oxidizing layer (202) containing a different element which is different from an element contained in said interconnect layer, said anti-oxidizing layer being disposed between said interconnect layer and said protective film, wherein said electrode pad is in electrical contact with said interconnect layer and is disposed on said protective film in a position to permit contact

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with a probe, and wherein said different element of said anti-oxidizing layer has a lower oxidation-reduction potential than that of said element contained in said interconnect layer, said anti-oxidizing layer being disposed on said interconnect layer. The limitation, “to inhibit corrosion ... said probe” is a recitation of the intended use of the claimed device. Terms that simply set forth the intended use, a property inherent in or a function, do not differentiate the claimed composition of these elements from those known to prior art.

In re claims 2 and 21, Cowens discloses the devices of claims 1 and 20 respectively, wherein said interconnect layer is a copper-containing metal.

In re claims 3 and 22, Cowens discloses the devices of claims 1 and 20 respectively, wherein said different element is a metal having a lower oxidation-reduction potential than that of a metal contained in said interconnect layer.

In re claims 4 and 23, Cowens discloses the devices of claims 3 and 22 respectively, wherein said different element is a group IV element (silicon).

In re claims 5 and 24, Cowens discloses the devices of claims 4 and 23 respectively, wherein said different element is Si.

In re claims 1 and 20, Cowens (Fig. 2B) discloses a semiconductor device, comprising:

- an interconnect layer (211) provided on a semiconductor substrate;
- a protective film (215) provided on said interconnect layer;
- an electrode pad (217) provided on said protective film; and
- an anti-oxidizing layer (212) containing a different element which is different from an element contained in said interconnect layer, said anti-oxidizing layer being disposed between

said interconnect layer and said protective film, wherein said electrode pad is in electrical contact with said interconnect layer and is disposed on said protective film in a position to permit contact with a probe, and wherein said different element of said anti-oxidizing layer has a lower oxidation-reduction potential than that of said element contained in said interconnect layer, said anti-oxidizing layer being disposed on said interconnect layer. The limitation, "to inhibit corrosion ... said probe" is a recitation of the intended use of the claimed device. Terms that simply set forth the intended use, a property inherent in or a function, do not differentiate the claimed composition of these elements from those known to prior art.

*Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cowens as applied to claims 1 and 20 above, and further in view of Lee et al. (US 2002/0121692 A1)).

In re claims 6 and 25, Cowens (Figs. 2A and 2B) discloses the devices of claims 1 and 20 respectively, but does not expressly disclose the protective/passivation film including titanium nitride. Lee (e.g. Fig. 5) discloses a device similar to that of Cowens in which the protective/passivation layer (34) comprises titanium nitride. It would have been obvious for one skilled in the art at the time of the invention to use a titanium nitride (Lee; section [0074], lines 4-5) layer of Lee for the device of Cowens for the purpose, for example, of insulating and

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protecting the surface of the semiconductor chips from moisture and other contaminants and from mechanical damage during assembling of the chips (Lee; section [0073], lines 20-26).

5. Claims 7 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cowens (Fig. 2B) as applied to claims 1 and 20 above, and further in view of Akram et al. (U.S. Patent No. 6,617,687 B2).

In re claims 7 and 26, Cowens discloses the devices of claims 1 and 20 respectively, but does not expressly disclose the anti-oxidation layer wherein the layer comprises the different element and an element contained in the interconnect layer. Akram discloses a group IV element anti-oxidation layer of titanium nitride on top with a layer of aluminum on the bottom. It would have been obvious for one skilled in the art at the time of the invention to use this multi-layer layer with an aluminum bottom as disclosed by Akram over the aluminum contact (211) of Cowens for the purpose, for example, of preventing unwanted permanent or chemical bonding between surrounding metal layers (Akram; column 7, lines 43-52).

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-7 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

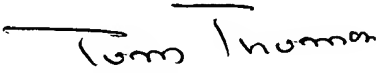
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 571-272-1729. The examiner can normally be reached on 5/4-9 1st Fri. Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jesse A. Fenty  
Examiner  
Art Unit 2815

  
TOM THUMAN  
SUPERVISORY PATENT EXAMINER